

- 1) **Purpose:** to provide hospitals with a concise guide for identifying casualties in the aftermath of a radiation incident who may have received a clinically significant dose of radiation.
- 2) **Regional RITN hospital contact information for specialized consultation:**
  - a. *Hospital Name:* [See list of RITN hospitals](#)
  - b. *Department*
  - c. *Phone*
  - d. *Email*
- 3) **Overview:** Ionizing radiation affects the hematopoietic system even at very low doses; hematology and oncology medical staff treat these effects daily. Irradiated patients may develop severe organ dysfunction over time and require intense and specialized management.
- 4) **For extensive information on the acute radiation syndrome** (hematologic, gastrointestinal, cutaneous, central nervous system), types of radiation incidents, and radiation decontamination, see: [www.remm.nlm.gov](http://www.remm.nlm.gov) (Radiation Emergency Medical Management (REMM) website)
- 5) **CONSULTATION/REFERRAL CRITERIA:** Any patient suspected of having a radiation injury can be discussed with your local RITN center. The ability to accept referrals will depend on the size of the incident and the capacity of regional RITN center(s).
  - a. **Criteria for considering RITN center consultation/referral include:**
    - i. Absolute neutrophil count less than 1,000/ $\mu\text{L}$
    - ii. Absolute lymphocyte count less than 1,000/ $\mu\text{L}$
    - iii. Severe nausea, vomiting and/or anorexia
    - iv. A localized cutaneous radiation injury that requiring extensive management
    - v. Suspected or known internal contamination (e.g. involving a wound, the lung or GI tract)
    - vi. Current facility not equipped to provide irradiated, leukoreduced blood products
  - b. **Manage comorbidities and possible sequelae of irradiation:**
    - i. See [www.ritn.net/Treatment/](http://www.ritn.net/Treatment/) for acute radiation syndrome treatment guidelines:
      1. Transfuse only irradiated and leukocyte-depleted blood products
      2. Administer myeloid cytokines (e.g. G-CSF), if indicated.
      3. Provide infection prophylaxis and/or treatment, as indicated
      4. Maintain fluid, electrolyte and nutritional balance
    - ii. Also see (REMM) website for *Prototype for Adult and Pediatric Medical Orders During a Radiation Incident* <http://www.remm.nlm.gov/adultorderform.htm>
  - c. **Laboratory evaluation:**
    - i. CBC with differential, absolute lymphocyte count (ALC) and absolute neutrophil count (ANC). If <48-72 hours since exposure, repeat q6 hours x 4, then q12 hours x 2, then daily.
    - ii. Serum amylase (may be elevated at absorbed doses > 0.5 Gy)
    - iii. Metabolic panel including electrolytes, renal and hepatic markers
    - iv. PT/aPTT
  - d. **Effects on Bone Marrow Function:**
    - i. Decreased platelet count (<100,000) - clinical presentation includes bruising, petechiae, epistaxis, blood in urine or stool
    - ii. Decreased white blood cell count (ALC<1,000/ $\mu\text{L}$  or ANC<1,000/ $\mu\text{L}$ ) – clinical presentation includes fever and infection
    - iii. Decreased red blood cell count (Hct < 30%) – clinical presentation includes pallor, fatigue, dyspnea with exertion

Hematopoietic (Bone Marrow) Acute Radiation Syndrome				
Dose* > 0.7 Gy (> 70 rads) (Mild symptoms may occur as low as 0.3 Gy or 30 rads)				
	Prodromal Stage	Latent Stage	Manifest Illness Stage	Recovery
Onset	• Onset occurs 1 hour to 2 days after exposure.			
Duration	• Stage lasts for minutes to days.	• Stage lasts 1 to 6 weeks.	• Most deaths occur within a few months after exposure.	• There should be full recovery for a large percentage of individuals from a few weeks up to two years after exposure.
Signs/ Symptoms	• Symptoms are anorexia, nausea and vomiting.	• Stem cells in bone marrow are dying, although patient may appear and feel well.	• Symptoms are anorexia, fever, and malaise.  • Drop in all blood cell counts occurs for several weeks.	• In most cases, bone marrow cells will begin to repopulate the marrow.
General			• Survival decreases with increasing dose.  • Primary cause of death is infection and hemorrhage.	• Death may occur in some individuals at 1.2 Gy (120 rads).  • The LD50/60† is about 2.5 to 5 Gy (250 to 500 rads).

\* The absorbed doses quoted here are "gamma equivalent" values. Neutrons or protons generally produce the same effects as gamma, beta, or X-rays but at lower doses. If the patient has been exposed to neutrons or protons, the absorbed dose will be higher than the gamma equivalent dose.

† The LD50/60 is the dose necessary to kill 50% of the exposed population in 60 days.